

WHAT IS CLAIMED IS:

1. A method of performing a read operation from a magnetic random access memory (MRAM) cell in a memory cell string comprising:
 - applying a first current through the memory cell string, the first current comprising a constant current;
 - measuring a first voltage across the memory cell string;
 - applying a second current across the MRAM cell, the second current comprising a write sense current;
 - measuring a second voltage across the memory cell string; and
 - determining whether the first voltage differs from the second voltage.
2. The method of claim 1 further comprising:
 - determining that the MRAM cell is in a first state in response to the first voltage differing from the second voltage.
3. The method of claim 2 further comprising:
 - reading out a logic level associated with the first state in response to the first voltage differing from the second voltage.
4. The method of claim 2 further comprising:
 - determining that the MRAM cell is in a second state in response to the first voltage not differing from the second voltage.
5. The method of claim 4 further comprising:
 - reading out a logic level associated with the second state in response to the first voltage not differing from the second voltage.
6. The method of claim 1 further comprising:
 - applying the second current across the MRAM cell to set a reference layer of the memory cell to a known state.

7. A data storage device comprising:
 - a memory cell string that includes a first memory cell and a second memory cell coupled in series;
 - a current source configured to apply a first current through the string, the first current comprising a constant current; and
 - a circuit coupled to the memory cell string, the circuit configured to detect a change in a voltage across the memory cell string in response to the current source applying the constant current through the memory cell string and a second current being applied across the first memory cell, the second current comprising a write sense current.
8. The data storage device of claim 7 wherein the memory cell string has a first end and a second end, and wherein the current source is coupled to the first end.
9. The data storage device of claim 8 further comprising:
 - a ground source coupled to the second end of the memory cell string.
10. The data storage device of claim 7 wherein the circuit is configured to detect that the first memory cell was in a first state in response to detecting a change in the voltage across the memory cell string.
11. The data storage device of claim 10 wherein the circuit is configured to detect that the first memory cell was in a second state in response to not detecting a change in the voltage across the memory cell string.
12. A method of performing a read operation from a magnetic random access memory (MRAM) cell in a memory cell string comprising:
 - applying a constant voltage across the memory cell string;
 - measuring a first current through the memory cell string;
 - applying a second current across the MRAM cell, the second current comprising a write sense current;

measuring a third current through the memory cell string; and
determining whether the first current differs from the third current.

13. The method of claim 12 further comprising:
determining that the MRAM cell was in a first state in response to the first current not differing from the third current.
14. The method of claim 13 further comprising:
reading out a logic level associated with the first state in response to the first current not differing from the third current.
15. The method of claim 13 further comprising:
determining that the MRAM cell was in a second state in response to the first current differing from the third current.
16. The method of claim 15 further comprising:
reading out a logic level associated with the second state in response to the first current differing from the second current.
17. The method of claim 12 further comprising:
applying the second current across the MRAM cell to set a reference layer of the memory cell to a known state.
18. A data storage device comprising:
a memory cell string that includes a first memory cell and a second memory cell coupled in parallel;
a voltage source configured to apply a constant voltage across the string;
and
a means for detecting a change in a first current through the memory cell string in response to the voltage source applying the constant voltage across the memory cell string and a second current being applied across the first memory cell, the second current comprising a write sense current.

19. The data storage device of claim 18 wherein the first and second memory cells each have a first end and a second end, and wherein the voltage source is coupled to the first end of each of the first and second memory cells.

20. The data storage device of claim 19 further comprising:
a ground source coupled to the second end of each of the first and second memory cells.

21. The data storage device of claim 18 wherein the means is for detecting that the first memory cell was in a first state in response to detecting a change in the first current through the memory cell string.

22. The data storage device of claim 21 wherein the means is for detecting that the first memory cell was in a second state in response to not detecting a change in the first current through the memory cell string.